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THE IDENTITY OF CLADONIA LEPIDOTA FRIES

C. A. ROBBINS

(Plate 187)

THE plant determined by Fries as *C. lepidota* has occupied an interesting as well as an uncertain position almost from the first. The name chosen for it was unfortunate, having been used previously by several authors for an entirely different plant of somewhat doubtful relationship, first described by Acharius¹ as *Cenomyce gonorega* f. *lepidota*.

Fries considered the plant a good species and Tuckerman, who believed that "the interest in the study of Lichens lies in the resolution rather than in the over-estimation of differences" saw nothing in it to indicate a relationship between it and any other and therefore gave to it a specific name in his herbarium before he accepted the one proposed for it by Fries.²

Two authorities, however, have assumed a relationship for it and both find it in the typically scarlet-fruited *C. cristatella*. Nylander, whose *C. substraminea* was published in 1860, based his species upon the ochrocarpous form of *C. cristatella* to which he added a specimen of *C. lepidota* sent him by Tuckerman. Wainio³ referred to *C. cristatella*, as f. *lepidifera*, plants sent him from New Bedford by Henry Willey as *C. lepidota*, considering Fries' "nomen ineptum ob confusionem cum *C. lepidota* Nyl."

Willey did not agree with Wainio's disposition of the plant. Like Tuckerman and Fries he was convinced that it deserved specific

¹ Syn. Meth. Lich. 259. 1814.

² *Cladonia lepidota* Fr. ex Tuckerman, Syn. Lich. 1: 249. 1882.

³ Wainio, Act. Soc. Faun. Fl. Fenn. 10 (Mon. Clad. 2): 446. 1894.

rank as is shown by the labels he attached to specimens in his herbarium. His collection, now in the United States National Herbarium, contains five packets of mounted plants, all from Massachusetts: No. 1, from Essex County; Nos. 2, 3 and 5 from New Bedford; No. 4, from Weymouth. The specimens in packets Nos. 2 and 4 are accompanied by place data only. The others are labeled by Willey with an unpublished specific name based on Wainio's form name. In packet No. 3, in Willey's hand, occurs the note "According to Wain. Monog. Cladon. P. 2, p. 446 *Cl. lepidota* Fr. is f. *lepidifera* Wain. of *Cl. cristatella* var. *ochrocarpia* Tuck. But I do not agree."

To one who is familiar with the plant it is plain that Willey's disagreement was well-founded. *C. cristatella* is typically a scarlet-fruited species. Fries' plant is typically a brown-fruited species. Examples of the var. *ochrocarpia* are to be met with in which the yellowish or pale- to darker-brown apothecia shade into the typical scarlet coloration and there is, therefore, no question concerning Tuckerman's correctness in disposing of that plant as he did. Fries' *C. lepidota* does not show transitional changes of the kind; the apothecia are constantly pale- to darker-yellowish or brownish and there is nothing to indicate its position to be elsewhere than under Sect. *Ochrophaeae* of Wainio's arrangement of the genus. Moreover, there is a difference in chemical reaction. *C. cristatella*, in all states of development, yields no response except, perhaps, a brightening of the individually dominant color to KOH, either alone or in combination with CaCl. The other yields a distinct and immediate yellow reaction to these chemicals combined. Either of these differences is sufficient to separate it from *C. cristatella*.

A study of the plant, however, will show that its specific entity is much more diverse and complicated than was indicated by any of the authorities mentioned; and that various names given it were applied to what is merely one of a group of forms, the whole constituting a distinct and widely distributed species.

C. lepidota Fries is represented in the Tuckerman herbarium by specimens from South Carolina, New Jersey, and Massachusetts. It is also recorded in the Synopsis from Mexico. With the exception of part of those from New Jersey, the plants are characterized by having the tips of the podetia broken into numerous short, sub-radiate segments which are minutely squamulose and minutely

fruited, the apothecia abundant. The plants from New Jersey, for the most part similar, include others with the podetia more slender and with the tips terminated by solitary, or few, comparatively large apothecia. Similar plants occur in the Willey collections from New Bedford and Weymouth.

This latter mode of development, although so meagerly represented in the two herbaria, is common throughout the plant's range. In this form the plants resemble typical forms of *C. mitrula*, *C. subcariosa*, *C. clavulifera*, etc., and even more closely, *C. cristatella* var. *ochrocarpia*. Another distinctive form has the podetia conspicuously obconical. These forms represent, possibly, the normal fertile condition of the species; the divided-tipped plants, perhaps, a less fertile condition.

Any particular type of variation may be well-defined in just-evolving plants and that form may continue through the life of that plant or adult plants may occur in which various types have developed simultaneously. In fact, almost any colony is likely to yield several connecting forms and these may vary from any one to any other; in view of which it is surprising that the Tuckerman and Willey collections show so little variation.

Fries founded *C. lepidota* upon one of the more conspicuous forms of the species; another form has recently been segregated as a species by Merrill. There is excuse for this, for while there is considerable difference in appearance between the sturdy, obconical, large-fruited plants and the slender, elongate, smaller-fruited plants (see Plate No. 187, figs. 2 and 9) there is an even greater difference between these and the divided-tipped, minutely-fruited forms (fig. 15). Yet, as before stated, all will be found to be but variations in development, bound together by the common possession of distinctive characters, as well also as by the general occurrence of a series of connecting states.

The first unpreoccupied specific name clearly applicable to the *Cladonia lepidota* of Fries is (*C.*) *pedmontensis* Merrill, and this name must be adopted for it. An amplified description of the species with a key to its common forms follows.

CLADONIA PIEDMONTENSIS Merrill, Bryologist 27: p. 22, 1924. *C. substraminea* Nyl. Syn. Lich. p. 204. 1860 (in part); *C. lepidota* Fr. ex Tuck. Syn. 1, p. 249. 1882 (in part); *C. cristatella* f. *lepidifera* Wain. Act. Soc. Faun. Fl. Fenn. 10: (Mon. Clad. 2) 446. 1894. Primary squamules small, rounded, flat, entire but becoming some-

what elongate or expanded with rounded or sublinear segments, yellowish to yellowish-green above, white or faintly yellowish beneath, KOH (CaCl) + (above and beneath); podetia yellowish, yellowish-green or yellowish-glaucous, 20-30(-40) mm. tall, simple or branched, obconical, club-shape or somewhat elongate-cylindrical, the tips somewhat expanded and terminated by medium-size to comparatively large apothecia or with the tips somewhat thickened and divided into numerous short, subradiate, minutely-fruited segments, the apothecia abundant or rarely with the tips rather slender and sterile, corticate, the cortex continuous to areolately dispersed, smooth, rugose or warty, often becoming cracked or flaky and squamule-forming, impellucid, often somewhat pruinose, squamulose or esquamulose, neither sorediate nor granulose; KOH (CaCl) +; axils closed and rarely somewhat abortively cup-forming; apothecia pale-yellowish or yellowish-brown to light- or dark-brown.—The species is most easily distinguished from similarly constructed species by the color or from *C. cristatella* var. *ochrocarpia*, which it resembles in this respect (as well also from all others which it resembles in construction) by its chemical reaction. The divided-tipped form is unique. When growing, the colony of small, rounded, yellowish primary squamules is conspicuous and characteristic. It has been found in Massachusetts and Connecticut, south to Maryland, Virginia, West Virginia, North Carolina, South Carolina, Alabama and, according to Tuckerman, Mexico. It occurs on rich humus, sandy loam or sand and (more rarely) on decaying and decayed wood. The following are common variations.

Podetia none, the apothecia sessile on, or short-stipitate from, the surface and margins of the primary squamules.....f. **epiphylla** f. nov.
Podetia normally developed.

Podetial squamules none or basal.

Podetia stout, obconical, the apothecia comparatively large, terminal.....f. **obconica** f. nov. (figs 1, 2, 3.)

Podetia club-shape to cylindrical, often slender, some of the apothecia medium-size and solitary, others minute and densely clustered, the latter axillar as well as terminal.

f. **intermedia** f. nov. (figs. 8, 9, 10).

Podetial squamules present.

Podetia stout, obconical, the squamules uniform, the apothecia comparatively large, terminal. (Analogous to f. *obconica*.)

f. **squamulosa** f. nov. (figs. 4, 5, 6, 7).

Podetia club-shape or cylindrical, often slender, some of the apothecia medium-size and solitary, others minute and densely clustered, the latter axillar as well as terminal. (Analogous to f. *intermedia*).....f. **phyllocoma** f. nov. (figs. 11, 12).

Podetia cylindrical, the apical squamules much reduced and scale-like; tips somewhat expanded and divided into numerous, short, subradiate, minutely-fruited segments, the apothecia abundant.

f. **lepidifera** (Wain.) Robbins n. comb. (figs. 14, 15, 16, 17, 18).

Podetia densely squamulose throughout, the squamules uniform; tips sterile or sparsely fruited...f. **squamosissima** f. nov. (fig. 13).

The greater part of the specimens in the Tuckerman collection in

the Farlow Herbarium, Harvard University (labeled *C. Oakesii* and *C. lepidota*) and in the Willey Collection in the National Herbarium (labeled *C. lepidifera*) are similar to the form pictured in fig. 15 but both collections also contain a few plants similar to those in fig. 9. The ff. *obconica* and *squamulosa* are somewhat remote from f. *lepidifera* but are connected with it through the ff. *intermedia* and *phyllocoma*. These last have the much-divided fruited segments characteristic of the f. *lepidifera* but with these they also simultaneously develop the larger apothecia, borne on clavate or obconical tips, characteristic of the ff. *obconica* and *squamulosa*. Slender states of f. *obconica* are often almost exact counterparts of *C. cristatella* var. *ochrocarpia*. The f. *squamosissima*, apparently rarer, is densely squamulose and rather sterile.

In southeastern Massachusetts there is to be found a plant often associated with the preceding and which might rather easily be mistaken for one of its forms, particularly when it occurs in an unassociated colony. It may be described as follows:

C. simulata sp. nov.; primary squamules small to medium-size, rarely quite enlarged, the margins entire or with rounded to somewhat linear and often incised segments, greenish to yellowish-green above, white beneath, KOH—, CaCl— (in combination —); podetia yellowish-green or yellowish-glaucous to glaucous, 10–30 mm. tall, irregularly cylindrical, often more or less fissured, usually branched, the branches short, lateral or terminal, ascending or occasionally quite horizontal, the sterile apices often naked, corticate, the cortex persistent, especially basally, or often dispersed above and passing into small to minute, subpeltate squamules, neither sorediate nor granulate; KOH —, CaCl — (in combination —); apothecia light- to dark-brown, often blackish, minute to medium-size, clustered or scattered.—TYPE from rich humus and decayed wood, Wareham, Massachusetts. The plant has also been found in North Carolina by Dr. A. W. Evans. The species closely resembles *C. piedmontensis* f. *lepidifera* but is readily distinguished from that plant by its minus chemical reaction. It also suggests a small *C. squamosa* and even more so forms of *C. pityrea* to which it is obviously nearly related. It differs from both these species in color.

Specimens of *C. simulata* and of forms of *C. piedmontensis* have been deposited in the Osborn Botanical Laboratory, Yale University; the Farlow Herbarium, Harvard University; and the United States National Herbarium.

In preparing these notes the writer is under obligations to Dr. S. F. Blake and Professor A. W. Evans for helpful suggestions and

criticisms; to Dr. C. W. Dodge for assistance in the herbarium and to Dr. William R. Maxon, whose courtesy made possible the examination of Willey's specimens.

ONSET, MASSACHUSETTS.

EXPLANATION OF PLATE 187

CLADONIA PIEDMONTENSIS Merrill. Fig. 1, young plants (f. OBCONICA), Carver, Mass. *C. A. Robbins*, May, 1928; fig. 2, normally developed plants (f. OBCONICA), Carver, Mass. *C. A. Robbins*, May, 1928; fig. 3, normally developed plants (f. OBCONICA), Tryon, North Carolina, *A. W. Evans*, December, 1927; fig. 4, young plant (f. SQUAMULOSA), Washington, D. C., *S. F. Blake*, February, 1925; fig. 5, young plants (f. SQUAMULOSA), Prospect Hill, Fairfax County, Virginia, *S. F. Blake*, February, 1925; fig. 6, robust plants (f. SQUAMULOSA), High Point, North Carolina, *W. M. Tyler*, February, 1928; fig. 7, elongate plants (f. SQUAMULOSA), Charlotte, North Carolina, *F. W. Gray*, October 1924, (No. 388, *F. W. G.* in herb. Merrill, in Farlow Herbarium, Harvard University, *C. piedmontensis* Merrill, Bryologist, March, 1924. TYPE.); fig. 8, young plants (f. INTERMEDIA), Carver, Mass., *C. A. Robbins*, May, 1928; fig. 9, normally developed plants (f. INTERMEDIA), Carver, Mass., *C. A. Robbins*, May, 1928; fig. 10, elongate plants (f. INTERMEDIA), Carver, Mass., *C. A. Robbins*, May, 1928; fig. 11, normally developed plants (f. PHYLLOCOMA), Carver, Mass., *C. A. Robbins*, May, 1928; fig. 12, normally developed plants (f. PHYLLOCOMA), Fairhope, Alabama, *A. W. Evans*, February, 1925 (Herb. Yale Univ. No. 161); fig. 13 (f. SQUAMOSISSIMA), Carver, Mass., *C. A. Robbins*, May, 1928; fig. 14, young plants (f. LEPIDIFERA), Carver, Mass., *C. A. Robbins*, May, 1928; figs. 15 and 16, normally developed plants (f. LEPIDIFERA), Carver, Mass., *C. A. Robbins*, May, 1928; fig. 17, robust plants (f. LEPIDIFERA), Washington, D. C., *S. F. Blake*, March, 1925; fig. 18, normally developed plants (f. LEPIDIFERA), Burnt Mills, Maryland, *S. F. Blake*, February, 1926.

POLYGONELLA ARTICULATA (L.) Meisn., forma **atrorubens**, n. f., perianthiis atrorubentibus.—NEW HAMPSHIRE: sandy plains and borders of sandy woods, Nashua, October 3, 1928, *Fernald & Svenson*, no. 896 (TYPE in Gray Herb.).

The perianths of *Polygonella articulata* (generally known on the New England coast as "HEATHER") are ordinarily a delicate rosy-pink or pinkish-white or occasionally white. On the sand plains about Nashua the plant is so striking, on account of its intense dark-red or blackish-red color as to attract immediate attention.—M. L. FERNALD, Gray Herbarium.


SEVENTH REPORT OF THE COMMITTEE ON FLORAL AREAS.

THE present report deals with the first three tribes of the *Gramineae* in the Manual order, *Maydeae*, *Andropogoneae*, and *Panicaceae*,



FORMS OF CLADONIA PIEDMONTENSIS

Figs. 1-3, f. *OBCONICA*; 4-7, f. *SQUAMULOSA*; 8-10, f. *INTERMEDIA*;
 11 and 12, f. *PHYLLOCOMA*; 13, f. *SQUAMOSISSIMA*; 14-18, f. *LEPIDIFERA*.



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plus a single introduced species of the *Zoysiaeae*. Certain of the *Panicaceae* offer considerable taxonomic difficulties and some questions of nomenclature, which require preliminary attention.

Those relating to the genus *Paspalum* have been elsewhere discussed (RHODORA xxx. 133 (1928)). As to *Panicum*, we are inclined heartily to second the remark of Professors Wiegand and Eames (Cornell Univ. Agric. Exp. Sta. Mem. xcii. 83 (1926)) that "the separation of species . . . on the basis of degree of pubescence is to be regretted." Hitchcock and Chase have rendered invaluable service in patiently tracking down the types of all such proposed species and definitely placing them in a taxonomic scheme. Many of them they have reduced to synonymy. After a long pursuit of vanishing "characters" through a maze of slightly differing herbarium specimens, we suspect that the reduction might profitably be carried further. Are there any real specific lines between *P. columbianum*, *P. tsugetorum*, and *P. subvillosum*; *P. meridionale* and *P. albemarlense*? Where does *P. columbianum*, var. *thinium* leave off and *P. meridionale* begin? Was Bicknell, a keen observer and by no means averse to recognizing close species, right in reducing *P. oricola* to *P. meridionale* and in maintaining *P. Owenae*; or are Hitchcock and Chase, fortified by long monographic study of the genus, correct in reducing *P. Owenae* and retaining *P. oricola*?

Such questions we have, for the most part, been unable to answer satisfactorily; we have, as the most practicable method, here maintained, at least as varieties, nearly all the species recognized in recent treatments, so far as we are able to make them out in the material at hand. We have, however, accepted with a good deal of relief Prof. Fernald's telescoping of *P. Lindheimeri*, *P. huachucae*, etc., into a single species. This arrangement gives, in New England, natural ranges; and it is conducive to ease in naming specimens, a quality which should appeal strongly to anyone condemned to struggle with this group. We have followed Dr. Hitchcock's earlier reduction of *P. Clutei* to synonymy under *P. mattamuskeetense* in preference to his later re-separation of the two. *P. oligosanthos* we have omitted altogether. Material of it from the southeastern states is at least varietally distinct from *P. Scribnerianum*, and the latter may stand as a species, as species go in *Panicum*; but the New England collections referred to *P. oligosanthos* appear to us to represent only slender states of *P. Scribnerianum*. New England reports of *P. lucidum* seem also to be erroneous.

In volume xiv of RHODORA, Mr. F. T. Hubbard published an article in which, in the course of applying the provision of the International Rules that no name shall be rejected because of the existence of an earlier homonym which is universally regarded as non-valid, he made several changes in the Manual names of species of *Panicum*. At the time, we, in common with other New England botanists, accepted these changes; but recent examination of the evidence and experience with nomenclatorial questions since 1912 have convinced us that, in most cases, we all gave to the rule in question a more liberal interpretation than its authors intended or than is desirable. We are now of the opinion that the phrase "universally regarded" should be taken quite strictly and literally, as applying only to cases in which there is no reasonable doubt.

Three instances may serve as illustrations of what we mean. Mr. Hubbard revived *Panicum debile* Ell. (1816) for *P. verrucosum* on the ground that its earlier homonym, *P. debile* Desf. (1798), had been definitely reduced to synonymy under *Digitaria sanguinalis*. But in so comparatively recent and so authoritative a work as Richter's *Plantae Europaeae* (1890), *P. debile* Desf. is maintained as a full species and under *Panicum* (p. 25). It is, therefore, as we see it, not *universally* regarded as a synonym and is an effective bar to the use of *P. debile* Ell. Hence we have returned to *P. verrucosum*—incidentally a far more appropriate name.

Again, Mr. Hubbard took up *P. macrocarpon* Torr. (1824) in place of *P. Scribnerianum* Nash, for the reason that the earlier *P. macrocarpon* LeConte (1819) was a synonym of *P. latifolium* L. Its reduction depends, however, wholly on Dr. Hitchcock's typification of *P. latifolium*¹ which, like so many Linnaean species, contained more than one thing. We see no cause to question Dr. Hitchcock's assignment of the name; but it is not that in use for a long time previously and can hardly yet be said to have been universally accepted. We accordingly use *P. Scribnerianum*, about which there is nothing doubtful.

On the other hand, *P. elongatum* Salisb. Prod. 18 (1812) is absolutely invalid, being merely a renaming of the valid *P. italicum* L., and is therefore no bar to the use of *P. elongatum* Pursh (1814), which we here take up in place of *P. stipitatum* Nash.

Stuntz (U. S. Dept. Agr. Bur. Pl. Ind. Invent. Seeds and Pl.

¹ See Cont. Nat. Herb. xlii, 118 (1908).

Import. xxxi. 84 (1914)) has taken up for *Setaria glauca* (L.) Beauv. the name *Chaetochloa lutescens*, based on *Panicum lutescens* Weigel (or Willich), 1772,¹ on the ground that *P. glaucum* L. properly applies to the pearl millet, *Pennisetum americanum* (L.) Schum. He has been followed by Hitchcock and Chase (Cont. Nat. Herb. xxii. 165 (1920)) and Hubbard (RHODORA xviii. 232 (1916)), who made the transfer of Stuntz's name to *Setaria*. Stapf, however (Kew Bull. Misc. Inform. 1928, no. 4, 147), argues that though the two citations under *P. glaucum* proper in the first edition of the Species Plantarum refer to *Pennisetum americanum* and *Elytrophorus articulatus* respectively, Linnaeus himself, in Syst. ed. x. 870 (1758) and in the second edition of the Species Plantarum, redefined *P. glaucum* so as to make it apply to a plant which he had treated as var. γ in the first edition, but to which the specific name *glaucum* has ever since 1758 been attached; and that Linnaeus's decision should stand.

It may be doubted whether Linnaeus's action in shifting a name from what he had originally treated as the typical portion of the species concerned to what he had originally treated as a variety can properly be maintained under present-day nomenclatorial technique, however desirable it may be to maintain it. But, as Dr. Stapf indicates, the technical status of *P. lutescens* is at least as much open to doubt. Weigel, describing the differences between two species which grew in the fields about Stralsund, remarks that he *should have called one lutescens* ("*lutescens nominaverim*"; italics partly ours), while the other might answer to the name of *virescens*. He then goes on to say that *lutescens* is quite the same as *Panicum glaucum* L. (i. e., *P. glaucum* of the Systema, ed. x and the second edition of the Species Plantarum); and he nowhere directly makes the combination *Panicum lutescens*, though, in most cases, he carefully uses "*Panicum*" or "*P.*" before the specific name when citing the Linnaean species. This is very half-hearted publication; we doubt if it is publication at all.

Of course, even though Weigel's name were completely invalid, Stuntz would have had the right, under the International Rules, to take it up and validate it, had no other names intervened between 1772 and 1914. But there are at least six such names (Richter, Pl. Eur. i. 27). There is, indeed, something the matter with the

¹ The work in question, *Observationes Botanicae*, is apparently an academic dissertation, similar to those published by Linnaeus in the *Amoenitates*, done by a student named Willich under the direction of Weigel.

earlier of them. *P. cynosuroides* Scop. (1778) is, nomenclatorially, a transfer of *P. alopecuroides*, *A. cynosuroides* L. Syst. ed. x. ii. 870 (1759), the identity of which no one knows; *P. luteum* Georgi (1791) is, according to the Index Kewensis, a *nomen nudum*; *P. flavescens* Moench (1794) is antedated by *P. flavescens* Sw. (1788). However, *P. pumilum* Poir. Encycl. Suppl. iv. 273 (1797), transferred to *Setaria* by Roem. & Schult. Syst. ii. 891 (1817) appears to be clear of impediment (provided it can be proved a synonym of *S. glauca*; Hitchcock (Cont. Nat. Herb. xxii. 168) refers it with doubt to *S. geniculata*) and it is hereby freely offered to anyone who cares to apply another name to the species. Pending a conclusive threshing out of the matter by grass specialists, we cheerfully follow Stapf in retaining the familiar *S. glauca*.

Limitation of space prevents detailed enumeration of botanists from whom we have had help; but all have our thanks. In the preparation of this particular report, the active interest of Mr. S. N. F. Sanford and of Prof. J. F. Collins has been especially valuable. And we should be ungrateful indeed if we did not now and then make acknowledgment of our continuing debt to Prof. Fernald's unrivalled knowledge of the northeastern flora and his patient editorial attention to our work.

PRELIMINARY LISTS OF NEW ENGLAND PLANTS— XXXII.

The sign + indicates than an herbarium specimen has been seen; the sign — that a reliable printed record has been found.

Me. N. H. Vt. Mass. R. I. Conn.

I. MAYDEAE.

<i>Tripsacum dactyloides</i> L.....				+	+
<i>Zea Mays</i> L.....	+	—	+	+	+

II. ANDROPOGONEAE.

<i>Andropogon furcatus</i> Muhl.....	+	+	+	+	+
“ <i>glomeratus</i> (Walt.) BSP....				+	
“ <i>scoparius</i> Michx.....				+	+
“ “ “ var. <i>frequens</i>					
“ “ “ “ <i>Hubb.</i>	+	+	+	+	+
“ “ “ “ <i>polyclados</i> Scribn. & Ball....					
“ <i>virginicus</i> L.....				+	+
<i>Miscanthus sinensis</i> Anderss.....				+	+
<i>Sorghastrum nutans</i> (L.) Nash.....	+	+	+	+	+

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
<i>Sorghum caffrorum</i> Beauv.....				+		+
“ <i>halepense</i> L.....				+		+

III. ZOYSIEAE.

<i>Tragus racemosus</i> Hall.....	+			+		
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IV. PANICEAE.

<i>Cenchrus echinatus</i> L.....				+		
“ <i>pauciflorus</i> Benth.....	+	+	+	+	+	+
<i>Digitaria filiformis</i> (L.) Koeler.....				+	+	+
“ <i>Ischaemum</i> Schreb.....	+	+	+	+	+	+
“ <i>laevigulumis</i> Fernald.....				+		
“ <i>sanguinalis</i> (L.) Scop.....	+	+	+	+	+	+
<i>Echinochloa crus-galli</i> (L.) Beauv.....	+	+	+	+	+	+
“ “ “ “ <i>f. longiseta</i> (Trin.) Wiegand.....	+		+	+	+	+
“ “ “ “ <i>f. vittata</i> Hubbard.....				+		
“ <i>frumentacea</i> (Roxb.) Link..	+	+		+		+
“ <i>muricata</i> (Michx.) Fernald..	+	+		+	+	+
“ “ (Michx.) Fernald var. <i>microstachya</i> Wiegand.....	+	+	+	+	+	+
“ “ (Michx.) Fernald var. <i>occidentalis</i> Wiegand.....	+	+		+	+	
“ <i>Walteri</i> (Pursh) Nash.....				+	+	+
“ “ “ “ <i>f. laevigata</i> Wiegand.....				+		
<i>Leptoloma cognatum</i> (Schultes) Chase...		+	+			+
<i>Panicum aculeatum</i> H. & C.....						+
“ <i>agrostoides</i> Spreng.....	+	+	—	+	+	+
“ <i>albemarlene</i> Ashe.....				+	+	+
“ <i>amarum</i> Ell.....				+		+
“ <i>annulum</i> Ashe.....				+		
“ <i>Ashei</i> Pearson.....				+	+	+
“ <i>auburne</i> Ashe.....				+		
“ <i>Bicknellii</i> Nash.....				+		+
“ <i>boreale</i> Nash.....	+	+	+	+		+
“ <i>Boscii</i> Poir.....		—		+		+
“ “ “ var. <i>molle</i> (Vasey) H. & C.....						+
“ <i>calliphyllum</i> Ashe.....				+		
“ <i>capillare</i> L.....	+	+	+	+	+	+
“ “ “ var. <i>occidentale</i> Rydb.....	+	+	+	+	+	+
“ <i>clandestinum</i> L.....	+	+	+	+	+	+
“ <i>columbianum</i> Scribn.....	+	+	—	+	+	+
“ “ “ var. <i>thini-</i> um H. & C.....				+	+	+
“ <i>Commonsianum</i> Ashe.....				+		+
“ “ Ashe var. <i>Addi-</i> sonii (Nash) Stone.....				+		+
“ <i>commutatum</i> Schultes.....				+		
“ <i>depauperatum</i> Muhl.....	+			+	+	+

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
<i>Panicum depauperatum</i> Muhl. var. <i>psillophyllum</i> Fernald.....	+	+	+	+	+	+
" <i>dichotomiflorum</i> Michx.....	+	+		+	+	+
" <i>dichotomiflorum</i> Michx. var. <i>puritanorum</i> Svenson.....				+	+	
" <i>dichotomum</i> L.....	+	+	+	+	+	+
" " " var. <i>barbulatum</i> (Michx.) Vasey.....			—	+	+	+
" <i>elongatum</i> Pursh.....						+
" <i>lanuginosum</i> Ell.....					+	
" <i>latifolium</i> L.....	+	+	+	+	+	+
" <i>Lindheimeri</i> Nash.....	+	+	+	+	+	+
" <i>Lindheimeri</i> Nash var. <i>fasciculatum</i> (Torr.) Fernald.....	+	+	+	+	+	+
" <i>Lindheimeri</i> Nash var. <i>implicatum</i> (Scribn.) Fernald.....	+	+	+	+	+	+
" <i>Lindheimeri</i> Nash var. <i>septentrionale</i> Fernald.....	+	+	+	+	+	+
" <i>linearifolium</i> Scribn.....	+	+	+	+	+	+
" <i>linearifolium</i> Scribn. var. <i>Wernerii</i> (Scribn.) Fernald.....	+	+	+	+	+	+
" <i>longifolium</i> Torr.....				+	+	+
" <i>mattamuskeetense</i> Ashe.....				+	+	
" <i>meridionale</i> Ashe.....				+	+	+
" <i>microcarpon</i> Muhl.....				+	+	+
" <i>miliaceum</i> L.....	+	+	+	+	+	+
" <i>oricola</i> H. & C.....				+	+	+
" <i>Owenae</i> Bickn.....				+		
" <i>philadelphicum</i> Bernh.....				+	+	+
" <i>polyanthes</i> Schult.....				+		
" <i>pseudopubescens</i> Nash.....						+
" <i>scoparioides</i> Ashe.....			—	+		+
" <i>scoparium</i> Lam.....				+	+	
" <i>Scribnerianum</i> Nash.....	+	+	+	+	+	+
" <i>sphaerocarpon</i> Ell.....		—	+	+	+	+
" <i>spretum</i> Schultes.....	+	+	+	+	+	+
" <i>subvillosum</i> Ashe.....	+	+	+	+	+	+
" <i>texanum</i> Buckl.....				+		
" <i>tsugetorum</i> Nash.....	+	+	+	+	+	+
" <i>Tuckermani</i> Fernald.....	+	+	+	+	+	+
" <i>verrucosum</i> Muhl.....				+	+	+
" <i>villosissimum</i> Nash.....				+	+	+
" <i>virgatum</i> L.....		+	+	+		+
" " " var. <i>spissum</i> Linder.....	+	+			+	+
" <i>Wrightianum</i> Scribn.....				+		
" <i>xanthophysum</i> Gray.....	+	+	+	+		+
<i>Paspalum circulare</i> Nash.....						+
" <i>psammophilum</i> Nash.....				+	+	+
" <i>pubescens</i> Muhl.....		+	+	+	+	+
" <i>setaceum</i> Michx.....				+	+	
<i>Setaria geniculata</i> (Lam.) Beauv.....				+		+
" <i>glauca</i> (L.) Beauv.....	+	+	+	+	+	+
" <i>italica</i> (L.) Beauv., subsp. <i>stramineofructa</i> Hubbard.....	+	—		+		+
" <i>italica</i> (L.) Beauv., subsp. <i>stramineofructa</i> Hubbard, subvar. <i>germanica</i> (Mill.) Hubbard....	+			+	+	+

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
<i>Setaria italica</i> (L.) Beauv., subsp. stramineofructa Hubbard, var. <i>Hostii</i> Hubbard.....	+			+		+
" <i>italica</i> (L.) Beauv., subsp. stramineofructa Hubbard, subvar. <i>Metzgeri</i> (Körnicker) Hubbard.	+	+	+	+	+	+
" <i>verticillata</i> (L.) Beauv.....		—	+	+	+	+
" <i>viridis</i> (L.) Beauv.....	+	+	+	+	+	+
" <i>viridis</i> (L.) Beauv. var. <i>Weinmannii</i> (R. & S.) Brand.....	+	+	+	+		

The following references will help to account for names in the above list which are not in the Manual or are there used in different categories: Bicknell, Bull. Torr. Bot. Club xxv. 185 (*Panicum Owenae*); Chase, Cont. Nat. Herb. xxii. 67 (*Cenchrus pauciflorus*); Fernald, RHODORA xxi. 110 (*Panicum Tuckermanni* and *P. capillare*, var. *occidentale*); xxii. 102 (*Digitaria laeviglumis*), xxiii. 193, 194, 227 (*Panicum depauperatum*, var. *psilophyllum*, *P. linearifolium*, var. *Wernerii*, *P. Lindheimeri* and vars.); Fernald & Wiegand, RHODORA xii. 133 (*Setaria viridis*, var. *Weinmannii*); Hitchcock, Cont. Nat. Herb. xxii. 168 (*Setaria geniculata*); Hitchcock & Chase, Cont. Nat. Herb. xv. 94 (*Panicum amarum*); Hubbard, RHODORA xviii. 231, 232 (*Digitaria Ischaemum*, *Setaria viridis*, var. *Weinmannii*), Am. Journ. Bot. iv. 169 (varieties of *Setaria italica*); Linder, RHODORA xxiv. 11 (varieties of *Panicum virgatum*); Stone, Pl. So. New Jersey 505 (*Panicum Commonsianum*, var. *Addisonii*); Svenson, RHODORA xxii. 154 (varieties of *Panicum dichotomiflorum*); Vasey, Bull. U. S. Dept. Agric. Div. Bot. viii. 30 (*Panicum dichotomum*, var. *barbulatum*); Wiegand, RHODORA xxiii. 49 (*Echinochloa*).

Of the rarer introduced species in our list, *Miscanthus sinensis* has been found at Boston and Worcester, Mass., and Greenwich, Conn.; *Tragus racemosus* at North Berwick, Maine (Parlin) and South Boston (C. E. Perkins); *Panicum texanum* in cotton waste at Malden (F. S. Collins); and *Cenchrus echinatus* at Lowell (Swan). The Sorghums are occasionally spontaneous in southern New England and *Zea Mays* as far north as New Hampshire. The other foreign species are more or less well-known weeds, some of them only too familiar.

Geographically, the groups here considered are notable for the great preponderance of southern species. There is none which, in New England, is strictly northern; the majority are either found chiefly in the three southern states or are entirely confined to them.

The geographic arrangement follows closely the lines of previous reports, with one exception. We are recognizing tentatively a new group, under the caption "Chiefly east of the Connecticut." The species assigned to it are not found west of the Connecticut Valley except in southern Connecticut; they do not reach northern New Hampshire; and in Maine they do not penetrate much, if any, north of the 45th parallel. Their collective range dovetails almost perfectly with that of the calcicolous group (see RHODORA xxii. 87); herein may be found a hint as to the reason for their peculiar distribution. They are probably plants of strongly acid soils, and such soils are found more abundantly in eastern New England than in western and northern, where calcareous areas are frequent.

In addition to the species here enumerated, *Solidago uniligulata* belongs with this group (see RHODORA xxvii. 65).

I. GENERALLY DISTRIBUTED.—*Andropogon scoparius*, var. *frequens*; *Panicum Lindheimeri*, var. *fasciculatum*; *P. capillare*, var. *occidentale*; *P. linearifolium*.

Only two of the above have an absolutely general distribution. *Andropogon scoparius*, var. *frequens* and *Panicum linearifolium* are not known in southeastern Maine east of the Penobscot Valley, nor near the coast east of the Kennebec. The former is also absent from the Sandy River valley in Franklin Co., Maine.

II. RATHER GENERAL EXCEPT IN SOUTHEASTERN MASSACHUSETTS.—*Panicum boreale*; *P. Lindheimeri*, var. *septentrionale*; *P. Tuckermani*.

Panicum boreale has not been found in Rhode Island, but in all probability actually occurs there, since it is known from several stations in eastern Connecticut, some of them very near the state line.

III. RATHER GENERAL EXCEPT IN NORTHERN MAINE.—*Andropogon furcatus*; *Panicum agrostoides*; *P. capillare*; *P. clandestinum*; *P. depauperatum*, var. *psilophyllum*; *P. dichotomum*; *P. latifolium*; *P. Lindheimeri*, var. *implicatum*; *P. linearifolium*, var. *Werneri*; *P. tsugetorum*; *Sorghastrum nutans*.

Of the species here included, two only—*Panicum latifolium* and *P. Lindheimeri*, var. *implicatum*—have what may be called the standard range for this group. None of the others reach extreme southeastern Maine, and *Andropogon furcatus* is absent also from the coastal region east of the Kennebec. *Panicum agrostoides*, *P.*

dichotomum, and *Sorghastrum nutans*, though reaching the Penobscot Valley, have, so far as the specimens at hand show, comparatively few and scattered stations north of the 43rd parallel. *Panicum tsugetorum*, though getting well north in the Champlain Valley, is not known to us in Maine east of the Androscoggin. These four species constitute a transition to Group V, and would go almost as well in it.

In the other direction, *Panicum latifolium* and *P. linearifolium*, var. *Wernerii* thin out notably in southeastern Massachusetts. They have but one station each on Cape Cod and are not known from Nantucket or Martha's Vineyard. This is readily enough accounted for in the case of the former, a species of rocky woodlands; the reason for the latter's scarcity in this region is not so obvious.

IV. CHIEFLY EAST OF THE CONNECTICUT.—*Echinochloa muricata*; *Panicum depauperatum*; *P. spretum*; *P. virgatum*, var. *spissum*.

The typical forms of *Panicum depauperatum* and *Echinochloa muricata* have only lately been segregated from other varieties and are, of course, not recognized in any but the most recent local floras. Further data may show that they (and especially the former) do not belong in this group.

V. CHIEFLY THE THREE SOUTHERN STATES.—*Andropogon virginicus*; *Cenchrus pauciflorus*; *Digitaria filiformis*; *Panicum Ashei*; *P. Boscii*; *P. Boscii*, var. *molle*; *P. columbianum*; *P. dichotomiflorum*; *P. dichotomum*, var. *barbulatum*; *P. elongatum*; *P. Lindheimeri*; *P. microcarpon*; *P. philadelphicum*; *P. Scribnerianum*; *P. sphaerocarpon*; *P. villosissimum*; *Paspalum circulare*; *P. pubescens*; *P. setaceum*.

Nothing could better illustrate the difficulty of making any hard and fast geographic classification of New England plants than the species here included. Most of them are of obvious geographic affinity, as their ranges outside of New England show.³ But within our area, their distribution varies extraordinarily in detail. Some connect closely with group III; some, at the other extreme, penetrate no farther than Connecticut; and there is nearly every possible

³ These are, very uniformly, Maine, Massachusetts or Connecticut to Nebraska, Kansas or Missouri and southward. The exceptions are: *Cenchrus pauciflorus*, which is a widely distributed weed in the United States; *Panicum Scribnerianum*, which extends across the continent to Washington and south in the central United States to Texas, but is not known in the southeastern states; and *P. columbianum*, which is reported only from the coastal states and only as far south as Virginia. However different these may be in their ranges outside New England, within it they can only be placed in this group.

gradation between. Perhaps we shall know some time why, of several species of like general range and soil preference, all reaching their northeastern limits in New England, some should stop at one point, some a few miles beyond, and so forth—if, indeed, any other element than chance is involved.

The supplementary tables which follow give a graphic idea of this gradual shading off of ranges, and also of the rather irregular distribution of known stations north of latitude 43. For the sake of fullness and to show how not only the ranges of species but the groups themselves grade into one another, four transitional species from group III are included in table 2. The signs + and — have the same significance as in the main table at the beginning of this report.

Table 2. SPECIES WITH OUTLYING STATIONS NORTH OF 43°.

The abbreviations at the heads of the columns, taken from left to right, signify respectively the Champlain, Connecticut, Merrimac, Androscoggin, and Penobscot valleys.

	Champ.	Conn.	Merr.	Saco	Andr.	Penob.
<i>Sorghastrum nutans</i>	+	+			+	+
<i>Panicum dichotomum</i>	+		+			+
“ <i>agrostoides</i>		—	+	+	+	+
“ <i>tsugetorum</i>	+	+	+	+	+	
“ <i>Lindheimeri</i>	+				+	
“ <i>dichotomiflorum</i>				+		
<i>Cenchrus pauciflorus</i>	+	+	+			
<i>Panicum columbianum</i>	—		+			
<i>Paspalum pubescens</i>		+	+			
<i>Panicum dichotomum</i> var. <i>barbulatum</i>	—		+			
<i>Panicum Scribnerianum</i>		+	+			

A majority of the above species are generally distributed in the three southern states. *Panicum dichotomum*, var. *barbulatum*, *P. dichotomiflorum*, *P. Lindheimeri*, and *P. Scribnerianum*, however, are not found in Massachusetts west of the Connecticut Valley, and *P. Lindheimeri* is not known from Cape Cod. *Cenchrus pauciflorus* is said by Mrs. Flynn to be only introduced about Burlington (Contr. to the Botany of Vermont ix. 11 (1911)).

Panicum Boscii is reported from Maine in the Manual, but as that record is omitted in Hitchcock and Chase's Monograph of *Panicum*, it is probably erroneous and no account of it is here taken.

TABLE 3. SPECIES WITH NO STATIONS NORTH OF 43°.

	Conn.	R. I.	Mass. s. e. Cos.	Mass. n. e. Cos.	Mass. Conn. Valley	Mass. Berk. Co.
<i>Digitaria filiformis</i>	+	+	+	+	+	+
<i>Panicum sphaerocarpon</i>	+	+	+	+		+
“ <i>Ashei</i>	+	+	+	+		+
“ <i>philadelphicum</i>	+	+				+
<i>Andropogon virginicus</i>	+	+	+	+	—	
<i>Panicum microcarpon</i>	+	+	+	+		
“ <i>villosissimum</i>	+	+	—	+		
“ <i>Boscii</i>	+	+		+		
<i>Paspalum setaceum</i>	+	+	+			
<i>Panicum polyanthes</i>	+		+			
“ <i>Boscii</i> , var. <i>molle</i>	+					
<i>Paspalum circulare</i>	+					
<i>Panicum elongatum</i>	+					

VI. COASTAL PLAIN.—*Andropogon glomeratus*; *A. scoparius*; *A. scoparius*, var. *polyclados*; *Echinochloa Walteri*; *Panicum albemarlense*; *P. annulum*; *P. auburne*; *P. Bicknellii*; *P. columbianum*, var. *thinium*; *P. Commonsianum*; *P. Commonsianum*, var. *Addisonii*; *P. dichotomiflorum*, var. *puritanorum*; *P. lanuginosum*; *P. longifolium*; *P. mattamuskeetense*; *P. meridionale*; *P. oricola*; *P. Owenae*; *P. polyanthes*; *P. scoparium*; *P. verrucosum*; *P. Wrightianum*; *Paspalum psammophilum*.

In this group also there is considerable variation in details of range. *Panicum meridionale* extends north to Essex County, Massachusetts, and in the Connecticut Valley to Springfield. *Echinochloa Walteri*, *Panicum columbianum*, var. *thinium*, *P. Commonsianum*, var. *Addisonii*, and *P. oricola* reach northeastern Massachusetts, but not Springfield, though the second and third ascend the Connecticut to the vicinity of Hartford. *Panicum albemarlense* and *P. verrucosum* occur at Springfield, but not in northeastern Massachusetts. *Paspalum psammophilum* and *Panicum longifolium* reach neither, though found in all three southern states. Typical *Andropogon scoparius* and var. *polyclados* occur in northeastern and southeastern Massachusetts and in Connecticut, but have not been reported from Rhode Island. *Panicum Bicknellii*, *P. Commonsianum*, and *P. polyanthes* occur in southeastern Massachusetts and in Connecticut, but, likewise, have not been detected in Rhode Island. *P. scoparium* and *P. dichotomiflorum*, var. *puritanorum* are found both in Massachusetts and Rhode Island, but not in Connecticut. The rest are restricted to southeastern Massachusetts, except *Panicum lanuginosum* which is known only from Block Island.

VII. MARITIME.—*Panicum amarum*; *Setaria geniculata*; *Tripsacum dactyloides*.

These three species are all southern and none penetrates far into New England. *Setaria geniculata* reaches Cape Cod, *Tripsacum*, Rhode Island, and *Panicum amarum* only to Old Lyme, Conn., at the mouth of the Connecticut River.

VIII. MISCELLANEOUS.—*Digitaria laeviglumis*; *Echinochloa muricata*, var. *microstachya*; *E. muricata*, var. *occidentalis*; *Leptoloma cognatum*; *Panicum aculeatum*; *P. calliphyllum*; *P. commutatum*; *P. pseudopubescens*; *P. scoparioides*; *P. subvillosum*; *P. virgatum*; *P. xanthophysum*.

Digitaria laeviglumis is an endemic, known only from the original station near Manchester, New Hampshire. *Panicum subvillosum* occurs in Washington County, Maine, and thence westward at scattered localities (mostly south of the 45th parallel) to the Champlain Valley, and southward to Cape Cod and New Haven, Connecticut. It is not known from most of central Massachusetts, from Rhode Island, or from the Housatonic Valley. It is apparently most frequent near the coast from Massachusetts Bay northward. Typical *Panicum virgatum* is known from central and eastern Connecticut, from the Connecticut Valley as far north as Hartland, Vermont, from a single station each in the Champlain Valley and on Cape Cod, and from three in Middlesex and Essex Counties, Massachusetts.

Panicum xanthophysum is apparently frequent from the Penobscot Valley westward, south of the 45th parallel, and southward, through the highlands of central Massachusetts to the northern townships of Connecticut, where it stops abruptly. It is not known from southeastern Massachusetts or from Rhode Island. Though somewhat more extended southward, its range is very similar to that of typical *Alisma Plantago-aquatica*; should other species prove to have a like range, a special group may have to be erected to contain them.

The other species here placed are known from too few and too irregularly scattered stations to be placed definitely in any of the groups we have recognized.

C. A. WEATHERBY
C. H. KNOWLTON
R. C. BEAN

THE GENERIC NAME *RADICULA*

KENNETH K. MACKENZIE

REFERRING to Prof. Fernald's article on *Roripa islandica* (RHODORA 31: 17, 1929) I wish to raise the query whether under the Vienna (Brussels) code the name *Radicula* (Hill British Herbal 264 1756) should not be used instead of the later name *Roripa* (Scop. Fl. Carn. 520 1760).

The only reason at all for its rejection is a very arbitrary and silly provision of that code as follows:

"Art. 54. Names of genera must be rejected in the following special cases:

"1. When they coincide with a technical name concurrently used in morphology, unless they are accompanied by specific names . . .

"Examples.—Generic names such as *Lignum*, *Radix*, *Spina*, *Radicula* etc. would not now be admissible; on the other hand a generic name like *Tuber* should not be rejected when it has been published with specific names (*Tuber cibarium*, etc.)."

One can understand the logic in rejecting a name of the class referred to for the reason given, although it does not appeal to me, but it is certainly hard to understand why such a name otherwise to be rejected should become available for the reason given. If a name is objectionable because used in morphology it seems to me that it is still open to that objection if published with specific names. However, the rule is as given.

Hill did not use the binomial system, but he did give specific names both in English and in Latin under his genus *Radicula*, as follows: (1) Pinnate-leaved water Radish. *Radicula foliis pennatifidis*; and (2) Serrated-leaved water Radish. *Radicula foliis serratis*. He further illustrated both species (plate 38).

It will be noted that Hill's publication quite complied with the rule quoted, which does not require binomial specific names at all. His name of course is the proper name for those who follow priority.

Why anyone should go out of the way to invalidate such an unusually fine piece of work as Hill's publication of *Radicula* is very hard indeed to understand. Scopoli's genus *Roripa* (originally spelled *Rorippa* or *Roriopa* in the Index p. 599) (Fl. Carn. 520 1760), taken up in its place, was most superficially characterized and was soon abandoned by its author (Fl. Carn. ed. 2 2: 25 1772).

MAPLEWOOD, NEW JERSEY.

VEGETATIVE REPRODUCTION IN HYDRANGEA.—Mr. R. J. Eaton has recently (RHODORA, January, 1929) given an interesting account of *Hydrangea paniculata* as naturalized in Massachusetts, the first time that this shrub has been recorded as naturalized in North America. It grew "in rather dense irregular clumps," "forming a veritable tangle and in full flower"; thus the plant was well established. Mr. Eaton thinks it is probable that the plants had been propagated by seed, since there was no evidence of rooting at the tips of the recurved branches, as is so well exemplified by *Rubus*. There is, however, another method of vegetative reproduction, which has been recorded from a number of species of the genus, namely by root-shoots, and this would explain its abundance and irregular vegetation described by Mr. Eaton. It would also explain in what form the plant had escaped: as a mere fragment of a root, evidently originating from a garden, where the plant had been dug up and thrown away, because it was too plentiful! It is a well known fact that plants, notably trees and shrubs, producing root-shoots, often become a pest in cultivated places, gardens, parks, etc., and we know also that roots possess a marvelous power to preserve their life and power to sprout for many years; moreover, one single root may develop many shoots during the same season.¹ We feel sure that if Mr. Eaton visits the place again and lifts some of the smaller specimens, these will prove to represent root-shoots rather than seedling-plants. If our suggestion be correct, no long period of time would have been necessary for the abundant occurrence of the *Hydrangea*, because the growth of root-shoots is enormously fast and vigorous; notice for instance *Rhus*, *Ailanthus*, *Robinia*, *Sassafras* and many others. No doubt *Hydrangea paniculata* will in the course of some years become distributed to other localities, and this first record by Mr. Eaton is therefore of great importance from a geographical point of view.—THEO. HOLM, Clinton, Maryland.

¹ Compare: Holm, On the Development of Buds upon Roots and Leaves. Ann. of Botany, Vol. 39, 867-881. 1925.

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